Planned developments using the ray tracing method approach (and more…)

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SOFTWARE INTEGRATION (OASYS)

STANDALONE PYTHON PROJECTS (DABAM, HYBRID)

SHADOW3 DEVELOPMENT

RESEARCH TOPICS

- PARTIAL COHERENCE
- SAMPLE SIMULATION
- LENSES (TRANSFOCATORS – ABERRATION-FREE SYSTEMS)

OASYSIS ORANGE SYNCHROTRON SUITE (OASYS)

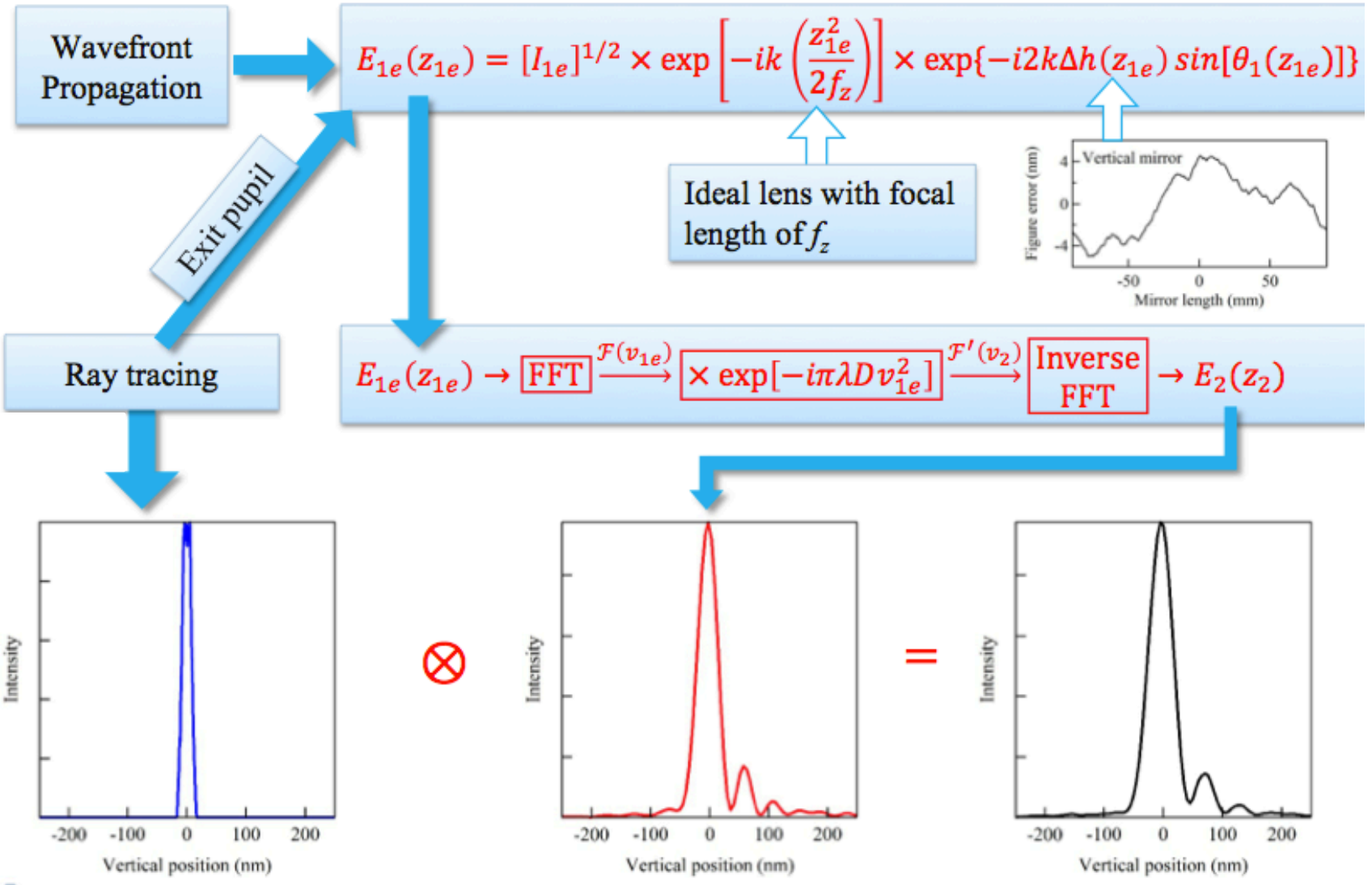
TODO

- Coordination with Ljubljana
- Installation issues
- Dependencies under pypi
- Windows support?

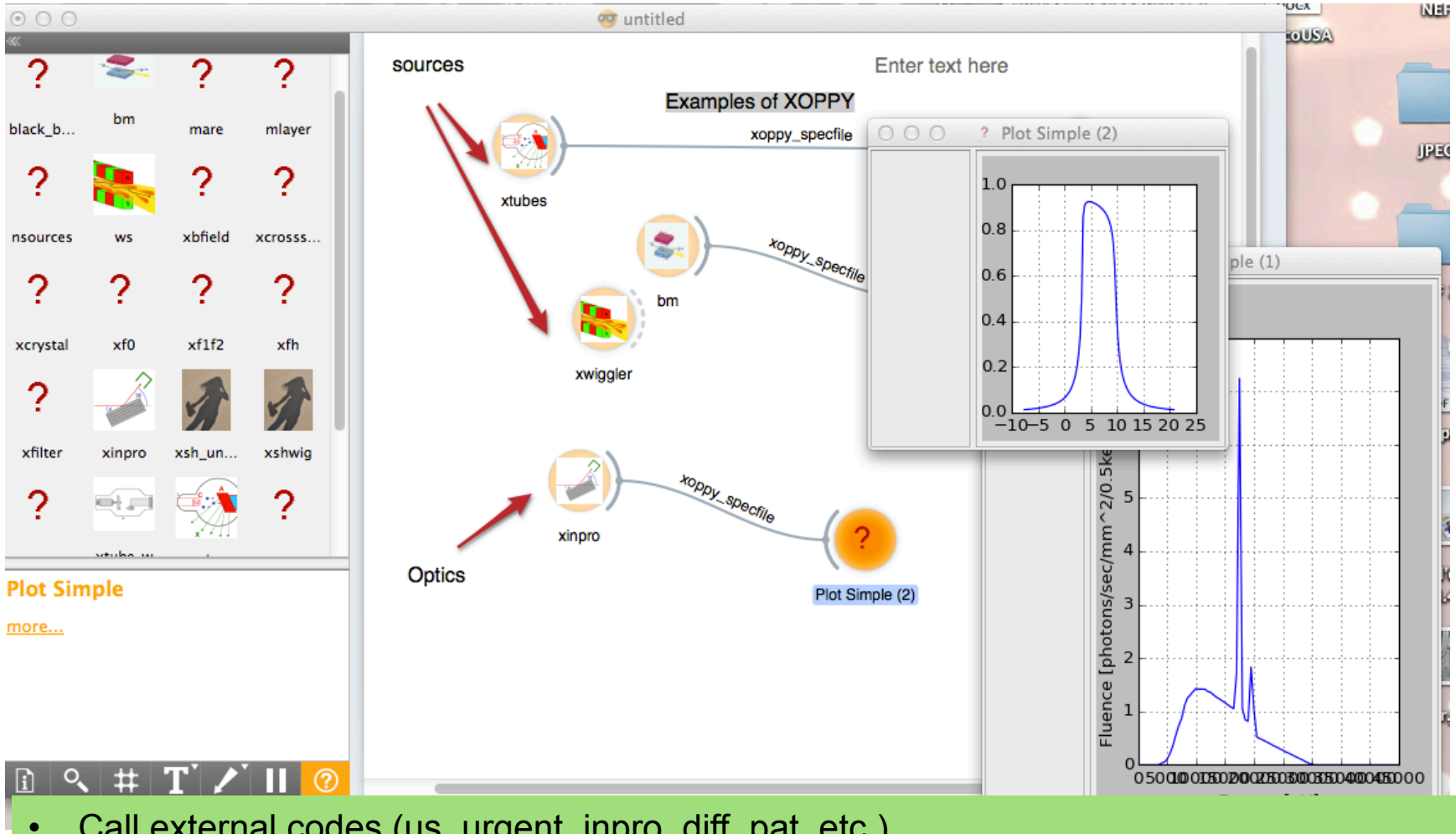
PROJECTS

ShadowOui	XOPpy	Optics/BL/ glossary tool	crystal
shadow3 xraylib pymca	xraylib pymca	optics srwlib shadow3 xraylib pymca	crystallib pymca

HYBRID METHOD UNDER PYTHON – SHADOWOUI INTEGRATION

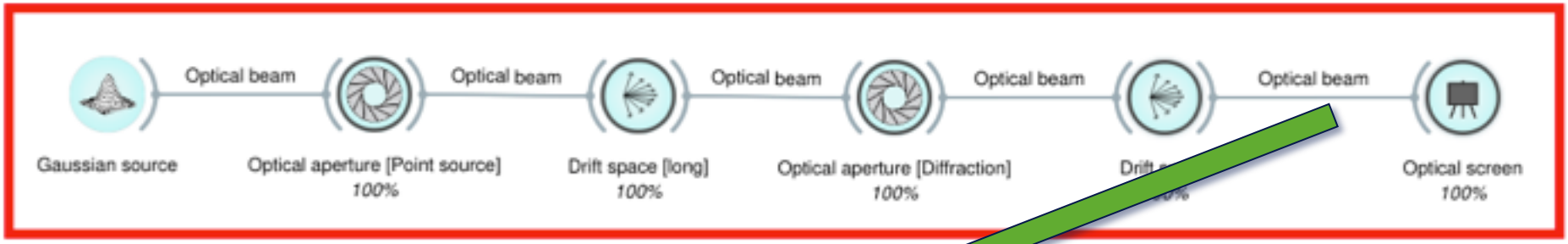


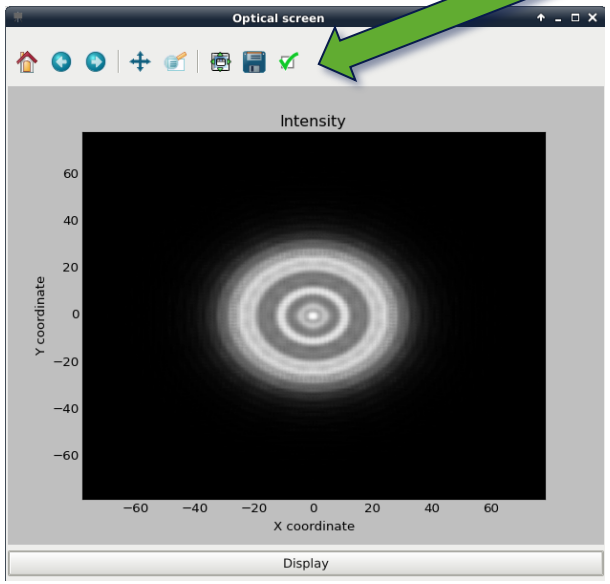
XOPPY



- Call external codes (us, urgent, inpro, diff_pat, etc.)
- BM and WIGGLER already rewritten in python
- DABAX replaced by ***xraylib https://github.com/tschoonj/xraylib/wiki***
- Optics to be rewritten with xraylib
- Visualization tools to be developped
- Chain of elements: I(E) XPOWER, new I(E,θ) a la SRCALC

SRW INTEGRATION IN OASYS VIA COMMON INTERFACE



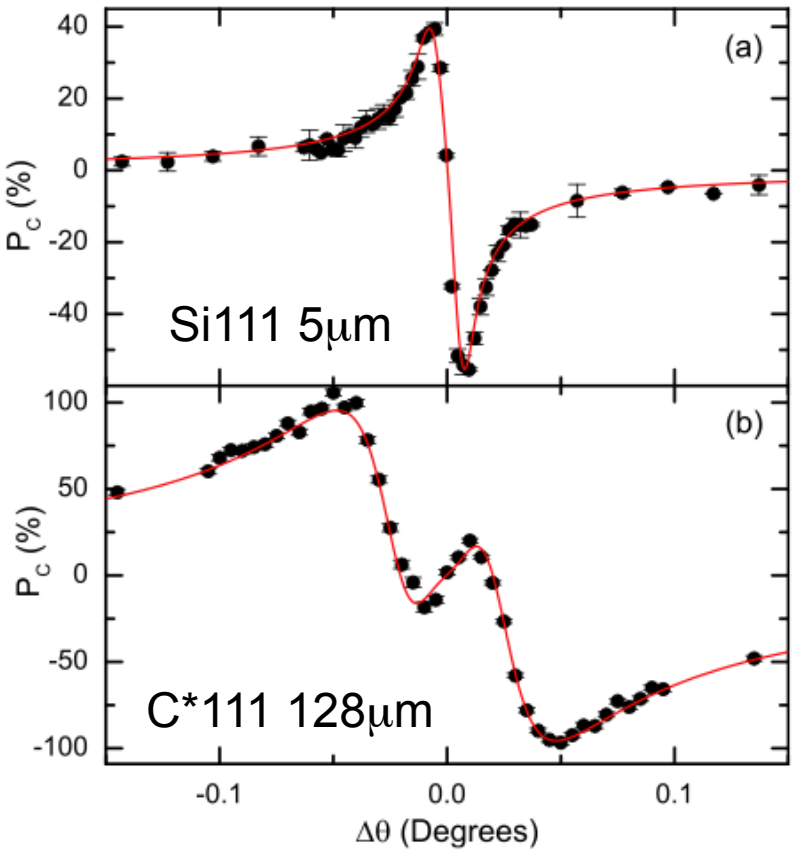


ONLY TESTS: PLANNED TO REWRITE USING optics
Common port to both SRW and SHADOW but
not 100% of SRW and SHADOW will be available.
It will coexist with ShadowOui and communicate with it

STOKES-MUELLER CRYSTAL OPTICS (M GLASS)

Bouchenoire, Morris, Hase

Appl. Phys. Lett. **101**, 064107 (2012)



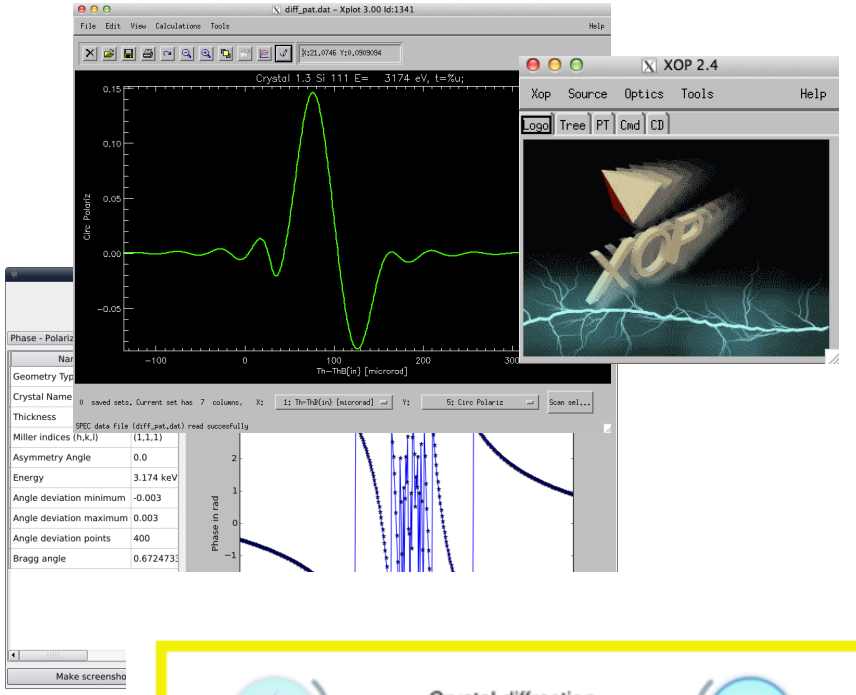
E=3.174 keV

$$\begin{pmatrix} E_x(t) \\ E_y(t) \end{pmatrix} = E^{(0)} \exp[i(-\omega t + \phi_x)] \begin{pmatrix} V_x \\ V_y \end{pmatrix},$$

Jones Matrices

$$\mathbf{R} = \begin{pmatrix} R_\sigma & 0 \\ 0 & R_\pi \end{pmatrix}$$

$$\mathbf{T} = \begin{pmatrix} T_\sigma & 0 \\ 0 & T_\pi \end{pmatrix} = \begin{pmatrix} t_\sigma e^{i\phi_\sigma} & 0 \\ 0 & t_\pi e^{i\phi_\pi} \end{pmatrix}$$



C Detlefs, M Sanchez del Rio, C Mazzoli Eur. Phys. J. Special Topics 208, 359–371 (2012)

DABAM: DATABASE FOR METROLOGY

Clean code (from script to module)
Check some profiles with submitters
Benchmark calculations with software in metrology labs
Finish the paper
Do some calculations:
- Simple things (in python)
- Example using hybrid

Widget for ShadowOui
Submission web form

Code and data development repository: https://github.com/srio/dabam

Future:
- Play with data
- Increase the database volume
- Think in 2D

Collaborations welcomed (profile data, software algorithms and style, calculations, integration in other software, etc.)

SHADOW3

IMPROVE PYTHON LIBRARY

REORGANISE AND CLEAN CODE

ERROR MANAGEMET

UNIT TESTS

INTEGRATE PREPROCESSOR IN KERNEL?

PYTHON API UNDER WINDOWS

UNDULATOR MODEL (tabulation I_π, I_σ, θ_x, θ_y, x, y, E, one e^-)

WIGGLER MODEL (numeric problems, centering radiation)

ADD/IMPROVE EMITTANCE (using tabulation with moments)

CRYSTAL OPTICS (any structure – forward diffracted beam)

STILL MUCH TO CLEAN

RESUSCITATE OLD MODELS:

(CAPILARIES – POLYNOMIAL – ELLIPTICAL WIGGLER)

INSTALLATION (PYPI)